



# Java in the Browser

**Session 403**





# Java in the Browser

**Scott Kovatch**  
**Java Runtime Engineer**

# Introduction

- Lots of deployment options are available on Mac OS X
- Which one is right for you?



# What You Will Learn

- What deployment technologies are available on Mac OS X
- How to add applet support to your application
- Current and new features for applet developers
- Current and new features for Java Web Start developers



# Java Deployment Options Today

**End User**

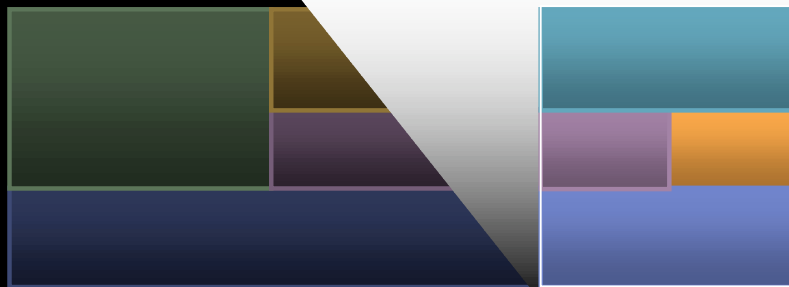
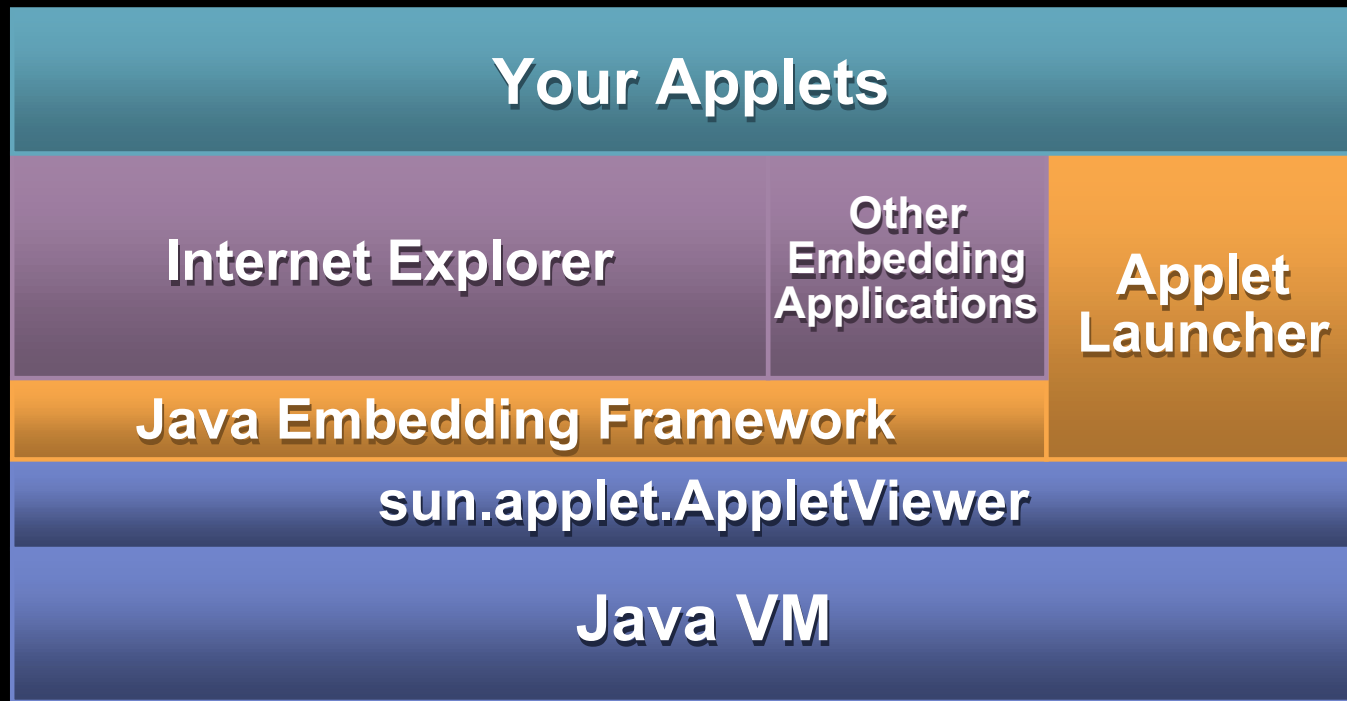


# Java Deployment Options Today

**End User**



# Applets: Where We Are Today



End User



# Applets: Where We Are Today

- How should you code your web page for an applet?
- Use the **<APPLET>** tag
- Remember that AWT widgets have Aqua look and feel
  - Some have different sizes than their Windows or Solaris counterparts
- If you determine you're on Mac OS X you have version 1.3.1
  - No need to detect browser or Java Plug-in in HTML





# Applets in Browsers Today

- Similar functionality to `/usr/bin/appletviewer` or Applet Launcher
- All output (`System.out`, `System.err`) goes to the Console application
- Signed applets supported
  - Netscape/IE-style signing in Internet Explorer
  - One signature works for all platforms



# Java Web Start

- An application (vs. applet) deployment technology
- One-click launching from the browser
- Dynamic updating of your application
- Platform neutral, but not platform ignorant
- Use Web Start when the browser and its limitations get in the way



# Java Web Start

- End-user's desktop is already configured to launch Web Start applications
  - No client install needed
- In most deployment situations no special server support is needed either
  - Optional deployment tools available from Sun just work on Mac OS X!



# Java Web Start: Mac OS X Details

- To install Mac OS X-specific resources use a `<resources>` element with an `os = "Mac OS X"` attribute

```
<resources>
  <j2se version="1.3.1"/>
  <jar href="lib/myjar.jar" version="1.2"/>
  <property name="key1" value="value1"/>
  <property name="key2" value="value2"/>
</resources>
<resources os="Mac OS X">
  <jar href="lib/MacExtras.jar"/>
</resources>
```



# Java Web Start: Mac OS X Details

- We do **not** support downloading of JREs
  - Java is already installed
  - Specifying a non-existent version will cause an error
- Native libraries must be in JARs and end in .jnilib





# Demo

**Applets and Java Web Start in 10.1.3**



# Embedding and the Future

**Scott Adler**  
**Java Platform Classes**

# Embedding Framework

- **/System/Library/Frameworks/  
JavaEmbedding.framework**
- Built for embedding **applets** into Carbon applications
- Main clients are web browsers





# Embedding Applets: Startup

- Create the JVM  
**JNICreateJavaVM**
- Request a JNIEnv for your (main) thread  
**javaVM->AttachCurrentThread**  
**( (void\*\*) &local\_env, (void \*) NULL)**
- Create the applet—see JavaApplet.h  
**CreateJavaApplet**
- Create the control—see JavaControl.h  
**CreateJavaControl**



# Embedding Applets: Lifetime

- Start

  - SetJavaAppletState(env, javaFrame, kAppletStart)**

- Move and Clip—set position and clip rect

  - MoveAndClipJavaControl—See JavaControl.h**

- Drawing—tell applet it is time to draw

  - DrawJavaControl—See JavaControl.h**

- Async Drawing—temporarily turn off drawing

  - StopJavaControlAsyncDrawing**

  - RestartJavaControlAsyncDrawing**

- Stop/Destroy

  - SetJavaAppletState(env, javaFrame, kAppletStop)**

  - SetJavaAppletState(env, javaFrame, kAppletDestroy)**



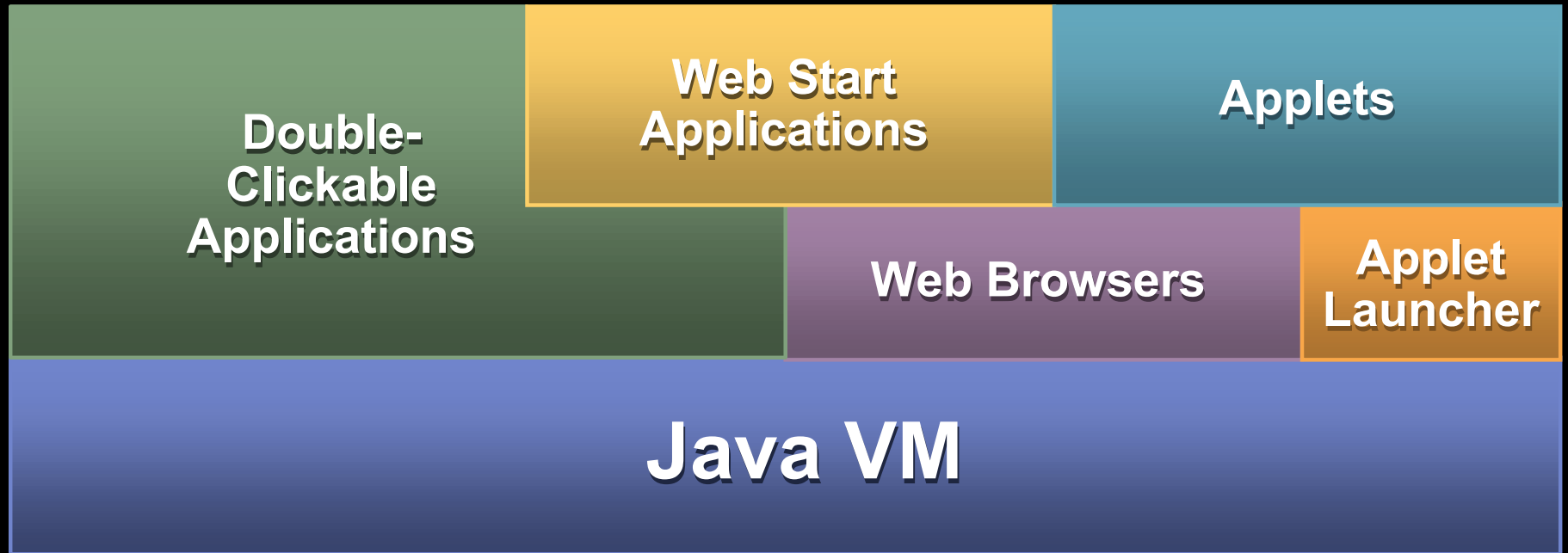
# Embedding Applets: Summary

Java Internet Plug-in should  
**eliminate the need** for  
JavaEmbedding.framework!



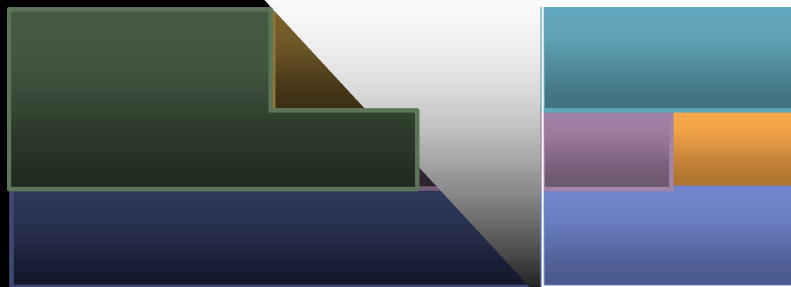
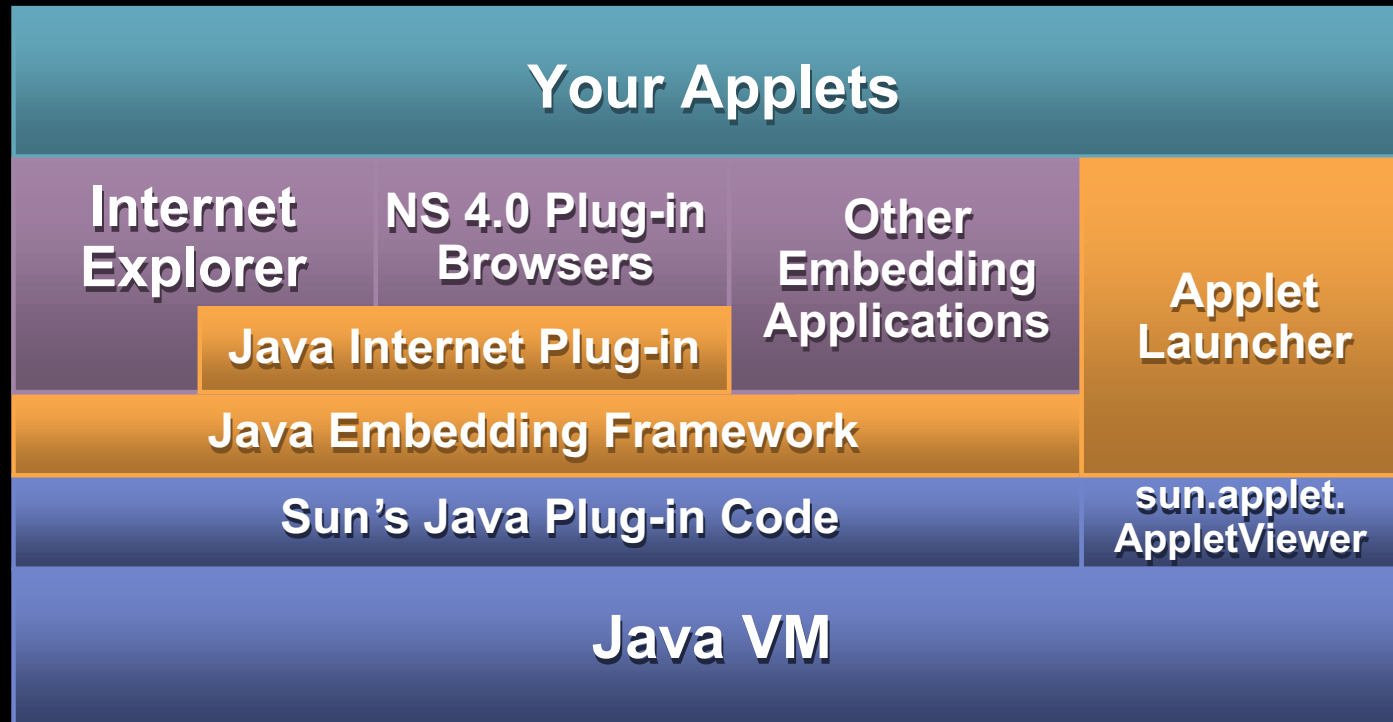
# Where We Are Going

## End User



# Applets: Where We're Going

New

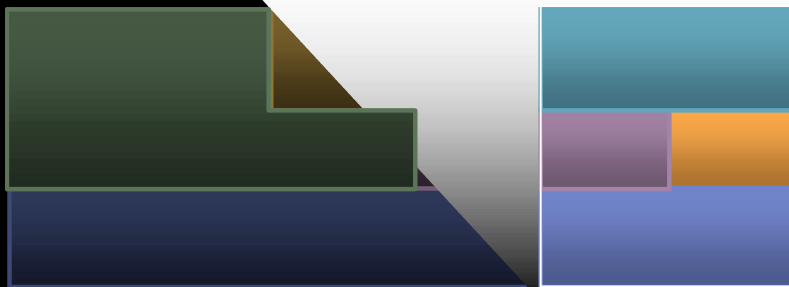
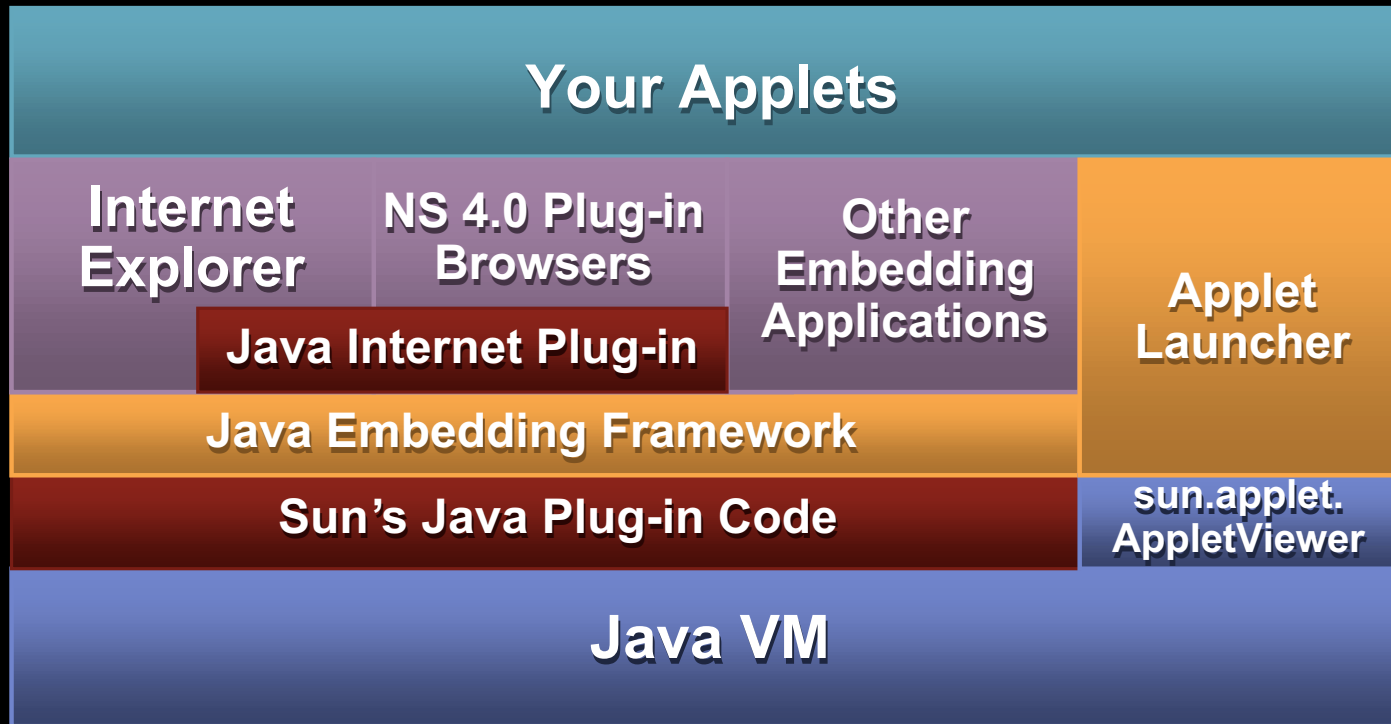


End User



# Applets: Where We're Going

New



End User



# Applets: The Future

New

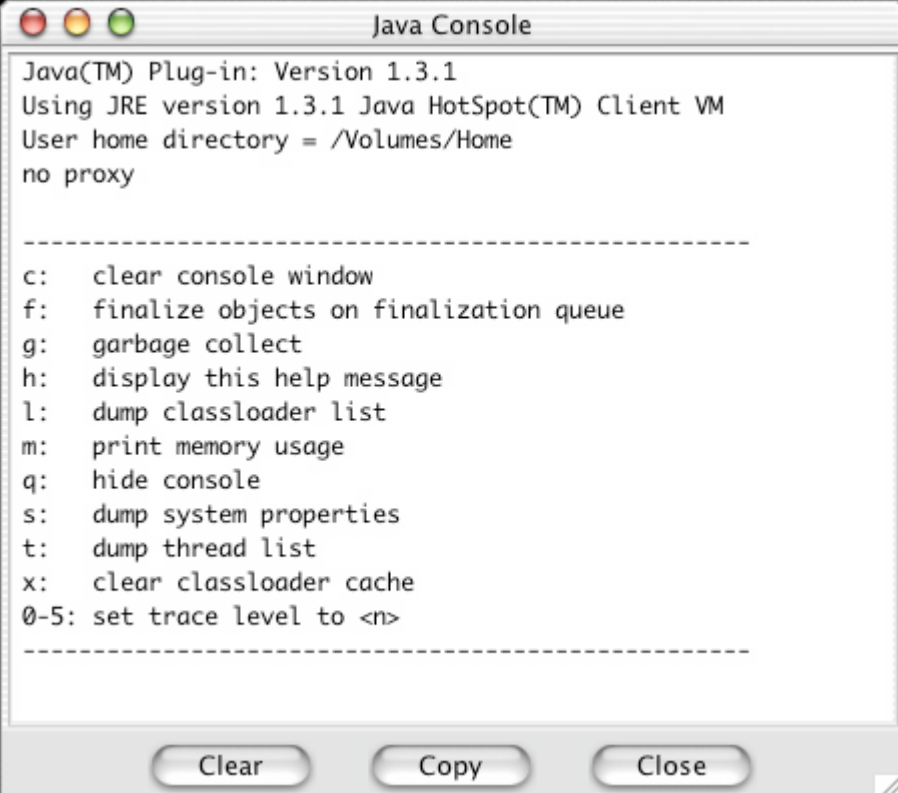
- Internet Explorer's appletviewer will be based on Java Plug-in's applet viewer, v1.3.1\_03
- Better user feedback when loading applets
- Better signed applet support



# Java Console

New

- Interactive
  - Thread info
  - Force GC
- System.out, System.err
- Logging and tracing



```
Java(TM) Plug-in: Version 1.3.1
Using JRE version 1.3.1 Java HotSpot(TM) Client VM
User home directory = /Volumes/Home
no proxy

-----

c:  clear console window
f:  finalize objects on finalization queue
g:  garbage collect
h:  display this help message
l:  dump classloader list
m:  print memory usage
q:  hide console
s:  dump system properties
t:  dump thread list
x:  clear classloader cache
0-5: set trace level to <n>

-----

Clear Copy Close
```

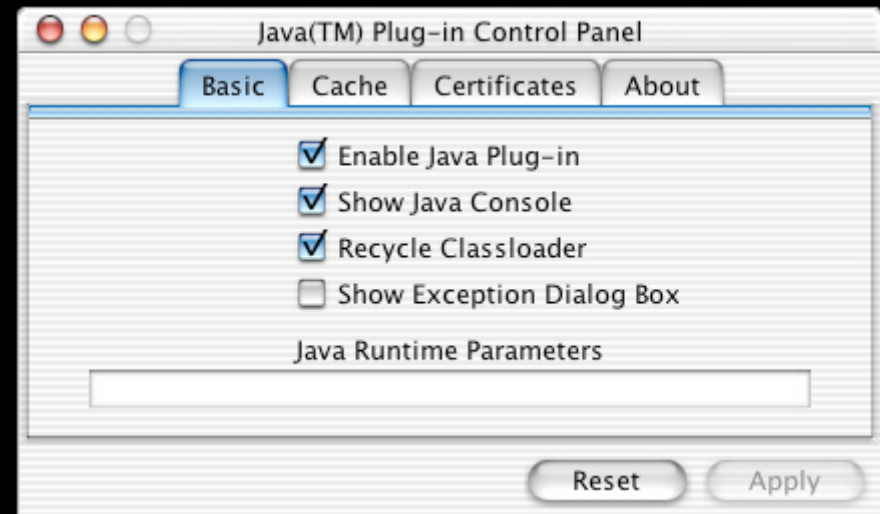




# Java Plug-in Settings

New

- In /Applications/Utilities
- Lets you set VM arguments
- . . among other things



# Java Internet Plug-in

New

- Wraps the Java VM inside a standard Netscape 4.0-style plug-in
- Netscape/Mozilla, Opera, IE—anything supporting NS4.0 plug-ins
- Based on 1.3.1\_03



# Supporting the Plug-in

- Eventually everyone is encouraged to use the **<applet>** tag
  - Some older browsers do not use the plug-in for **<applet>**
  - Browser makers should push **<applet>** to mime type of **application/x-java-applet**
- Force the plug-in by using **<object>** and **<embed>** tags
  - Use Sun's HTML converter to get HTML that will work in any browser
    - <http://java.sun.com/products/plugin/1.3/docs/htmlconv.html>



# A Sample of Browsers and Tags

Browser	<code>&lt;applet&gt;</code>	Other Tags
IE 5.1.x	JavaEmbedding framework	<code>&lt;object&gt;</code>
Netscape / Mozilla	<code>&lt;embed&gt;</code> application/x-java-applet	<code>&lt;embed&gt;</code>
Opera	JavaEmbedding framework	<code>&lt;object&gt;</code>
IE 6 on Windows	MS 1.1 VM or Java Plug-in	<code>&lt;object&gt;</code> to Java Plug-in





# Demo

**Java Plug-in Demo**



# New Applet and Web Start Features

**Scott Kovatch**  
**Java Runtime Engineer**

# Feature Focus: JAR Caching

New

- Stores your applet's JAR files for repeated use
- Similar to JAR caching on MRJ 2.2.x
- May need to modify your HTML to get it to work
- Cache is stored per user in `~/Library/Caches/Java`



# JAR Caching HTML

New

- **<PARAM NAME = "cache\_option"  
VALUE="plugin">**
  - Needed to turn on caching
- **<PARAM NAME = "cache\_archive"  
VALUE="a.jar, b.jar, c.jar ">**
  - Optional—specify the list of JARs you want to cache
- **<PARAM NAME = "cache\_version"  
VALUE="1.2.0.1, 2.1.1.2, 1.1.2.7">**

Corresponds to each item in "cache\_archive"





# JAR Caching HTML

- **<cache\_version>** does not require you to modify your JARs. If the version ID specified is newer than what is cached the JAR in the cache is updated
- If cache version is not specified plug-in requests to see if the JAR has changed on the server
- JARs in **cache\_archive** are searched first, then **ARCHIVE** tag is used



# Differences From 1.4

- JARs in the ARCHIVE parameter are **not** cached
- Does not support `<cache_version_ex>` parameter
- No JAR Indexing support
- Use `<cache_archive>` and `<cache_version>` now for best compatibility



# HTTPS Connections

- Making a secure connection is straightforward

```
URL myServer = new  
    URL("https://www.amazon.com");  
URLConnection theConn =  
    myServer.openConnection();
```

- No additional initialization needed
- HTTPS support provided by JSSE
  - See <http://java.sun.com/products/jsse>



# HTTPS Certificates

- Some certificates are provided
- Add your own to  
`/Library/Java/Home/lib/security/cacerts`



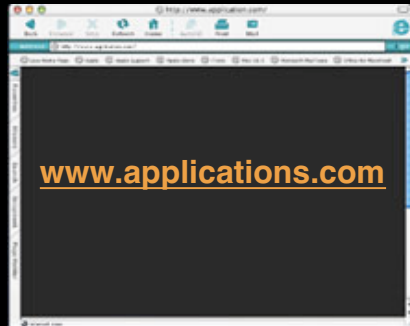
# Signed JARs

New

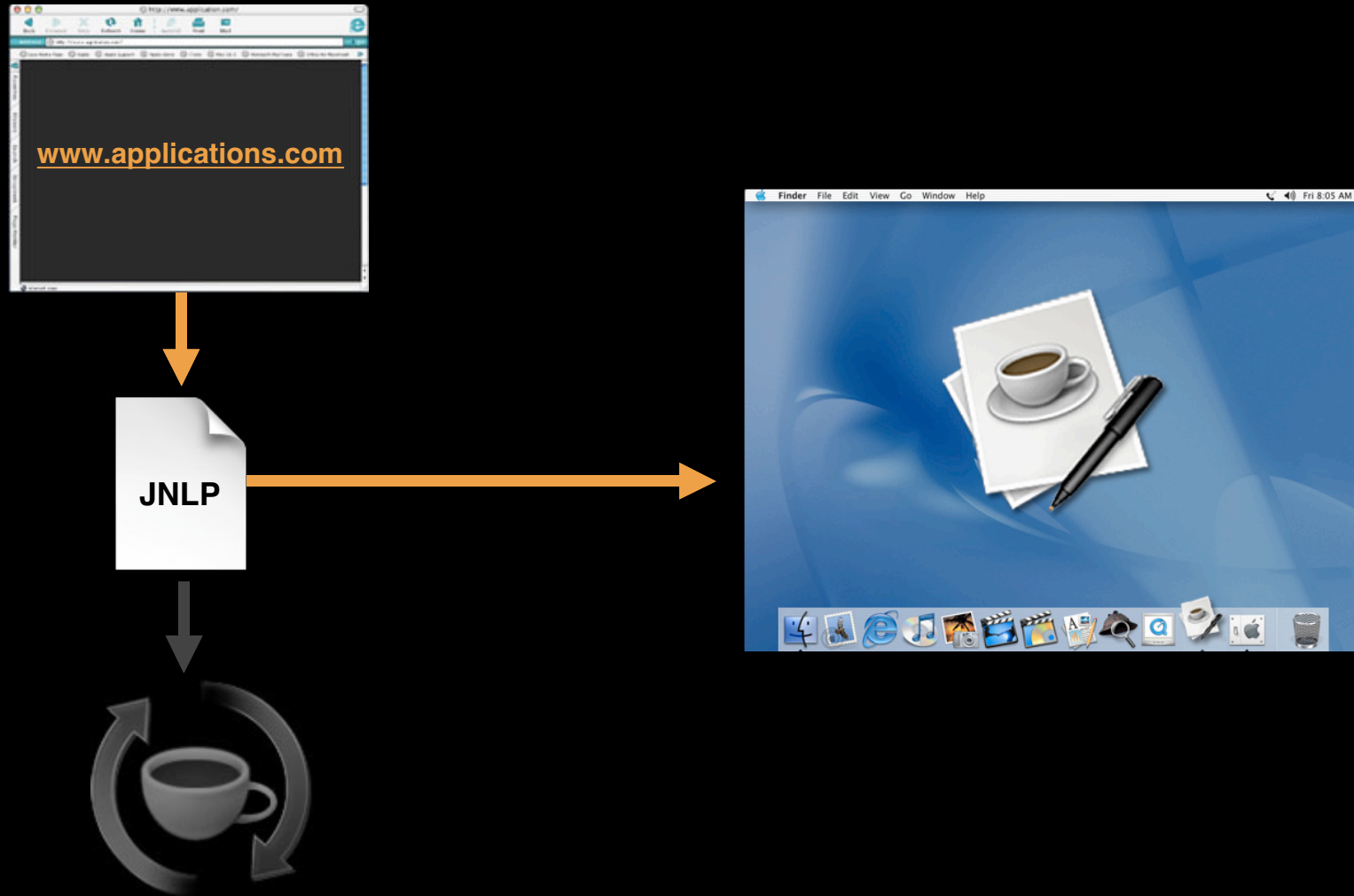
- SSL certificates are not the same as signed JAR certificates
- Signed JARs continue to work as they did in 10.1
- If user decides to ‘always trust’ your JAR file, certificate will be stored in user’s prefs folder, **Java Plug-in certificates 1.3.1**
- Can also view JAR certificates in the Settings app



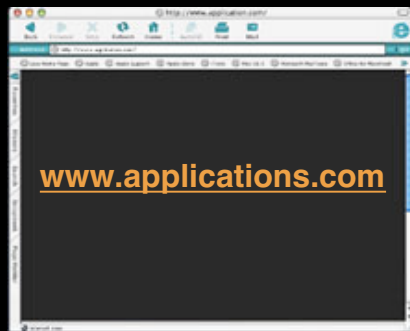
# Java Web Start: Today



# Java Web Start: The Future



# Java Web Start: The Future





# JNLP-based Applications



- Users can create double-clickable applications from downloaded Java Web Start applications
- Done automatically via Java Web Start
- Uses your Web Start icon as the application icon
- Downloads application to the user's Web Start cache



# JNLP-based Applications



- Also customizable, just like other double-clickable applications
- Find out how in the next session in Room J





# Demo

**Applet Caching  
Java Web Start**

# Which Should You Choose?

- Which is better—Applet or Web Start?
- Only you can decide!
- Are you working on a web browser?
  - Support the Java Internet Plug-in



# Roadmap

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**404 Tailoring Java Apps for Mac OS X:**  
Building double-clickable Java apps

Room J  
**Tues., 5:00pm**

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**405 Java Web Services:**  
XML, SOAP, etc.

Room C  
**Wed., 10:30am**

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**406 Java Virtual Machine Internals:**  
Take a look under the hood

Room C  
**Wed., 3:30pm**

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**407 Java Performance:**  
Making your applications faster

Room C  
**Fri., 9:00am**

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**FF003 Java Feedback Forum:**  
Talk to us

Room J1  
**Wed., 5:00pm**



# For More Information

- Java Web Start

<http://developer.apple.com/java/javawebstart/>

- Sun's Java Plug-in documentation

[http://java.sun.com/products/plugin/  
1.3/docs/index.docs.html](http://java.sun.com/products/plugin/1.3/docs/index.docs.html)

- Netscape/IE applet signing documentation

[http://java.sun.com/products/plugin/1.3/  
docs/nsobjsigning.html](http://java.sun.com/products/plugin/1.3/docs/nsobjsigning.html)



# How to Access Documentation

- Most up-to-date: PDF and HTML  
<http://developer.apple.com/techpubs/java>
- Hardcopy print-on-demand  
**Vervante.com** under **Related Resources**
- Product CD  
**Documents folder and installed in**  
[/Developer/Documentation/Java](#)
- Check ADC News for latest updates  
<http://developer.apple.com/devnews>



# Links and Resources

- Apple Java Developer Resources  
<http://developer.apple.com/java>
  - New Documentation!
- Java-dev Mailing List  
[java-dev@lists.apple.com](mailto:java-dev@lists.apple.com)
- Developer Technical Support  
[dts@apple.com](mailto:dts@apple.com)





# Who to Contact

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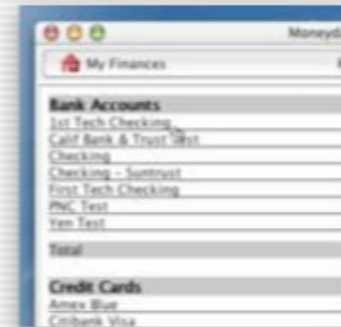
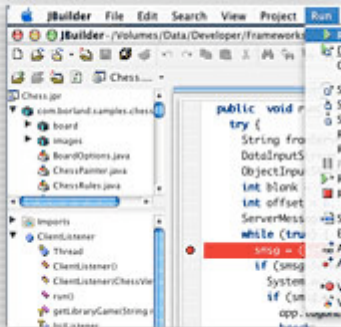
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<http://developer.apple.com/wwdc2002/urls.html>





# Q&A



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<http://developer.apple.com/wwdc2002/urls.html>

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